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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
NGUYEN, LAM S	
ART UNIT	PAPER NUMBER
2853	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/25/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/776,163	BEN-ZUR, OFER	
	Examiner	Art Unit	
	LAM S. NGUYEN	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 November 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 November 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/08/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 13-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwatsuki et al. (US 2003/0197772 A1) in view of Codos (US 6755518) and Rasmussen et al. (US 6536894).

Regarding to claim 13:

Iwatsuki et al. discloses a printing machine comprising:

a rigid frame (*FIG. 1, element 1*);

a linear motion X axis stage (*FIG. 1, elements 11, 11a-b*) mounted on said frame;

a printing table assembly (*FIG. 1, elements 12, 13, 15*) configured to move back and forth on said linear X axis stage (*FIG. 1: The stage 11 linearly moves from FRONT SIDE to REAR SIDE and versa*);

a linear motion Y axis stage (*FIG. 1, elements 2-4*) mounted on said frame perpendicular to said linear X axis stage, above said printing table assembly (*FIG. 1: The carriage 4 moves along a direction perpendicular to the moving direction of printing table assembly 11*);

an array of inkjet nozzles (*FIG. 1, element 5 and paragraph [0066]: The printing*

head 5 has a plurality of nozzles) mounted on said linear Y axis stage for linear motion perpendicular to said X axis stage (*FIG. 1: The carriage 4 moves the printhead 4 across the printing table assembly*);

wherein while said printing table assembly passes by said array of inkjet nozzles during said back and forth movements said array of inkjet nozzles is substantially static on said linear Y axis (*FIG. 1: During a movement of the table assembly to a desired position to start printing or to a position to unload the work fabric after printed, the ink jet printhead 4 is static*).

- Iwatsuki et al., however, does not teach a curing unit located above said printing table assembly and arranged to cure ink on media on said printing assembly, wherein said curing unit is an infrared system or a hot air blowing unit (**Regarding to claims 14-15**), and wherein at least part of said printing table assembly is a vacuum table (**Regarding to claim 18**).

Codos discloses an ink jet printing apparatus mounted on a rigid frame (*FIG. 1, element 111*) and including an ink jet printhead assembly (*FIG. 1, element 125)* for forming images on a printing medium (*FIG. 1, element 15)* conveyed by a vacuum conveyor (*FIG, 1, element 105, 121*) and a curing unit located above the printing medium to cure ink deposited on the printing medium, wherein said curing unit is an infrared system or a hot air blowing unit (*FIG. 1, elements 124, 126; column 8, lines 62-64: Heating by forced hot air is preferred, although other heat sources, such as infrared heaters can be used*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify Iwatsuki et al.'s printing apparatus to include a curing unit to cure ink deposited on the printing medium as disclosed by Codos.

The motivation for doing so would have been to cure the ink upon its contacting the substrate (printing medium) to prevent ink spreading and wicking that affect printing quality as taught by Codos (*column 2, lines 65-67*).

- In addition, Iwatsuki et al. does not teach an ironing unit located above said printing table assembly and arranged to iron media on said printing assembly before printing thereon.

Rasmussen et al. discloses an ink jet printing apparatus including an ink jet printhead (*FIG. 2B, element 14*) for forming images on a printing medium conveyed by a conveyor (*32*) and an ironing unit located above said printing medium and arranged to iron said printing media before printing thereon (*FIG. 2B, elements 201', 202; column 3, lines 32-38: Heating and pressing the print media upstream of printing to flatten print media prior to ink jet printing thereon*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify Iwatsuki et al.'s printing apparatus to include an ironing unit located above the printing medium to iron the printing media before printing as disclosed by Rasmussen et al.

The motivation for doing so would have been to provide a flat and stable media for printing in order to improve image quality as taught by Rasmussen et al. (*column 4, lines 19-24*).

- **Iwatsuki et al. also teaches the following claimed invention:**

Regarding to claim 16: wherein said printing table assembly comprises a media-holding plate (*FIG. 5A-D, element 15*) and an openable cover (*FIG. 1, element 14*) pivotally coupled to said media-holding plate for holding said media firmly against said plate (*FIG. 5A-D*).

Regarding to claim 17: wherein said media-holding plate (*FIG. 5A-D, element 15*)

includes a raised portion (*FIG. 5A-D, element 12*), and said cover includes a window (*FIG. 5A-D: The window is defined by the inner frame 19 of the frame structure (cover) 14*) of the same shape and slightly larger than said raised portion (*FIG. 5A-D, elements 12 and 19: The width of the inner frame (window) 19 is slightly wider than that of the raise portion 12*).

Regarding to claim 19: wherein said printing table assembly is a flattened plate (*FIGs. 5A-D, elements 12-13 and 15).*

2. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwatsuki et al. (US 2003/0197772 A1) in view of Codos (US 6755518) and Rasmussen et al. (US 6536894), as applied to claim 13, and further in view of Rezanka (US 5757407).

Iwatsuki et al., as modified, discloses the claimed invention as discussed above and also teaches wherein the printhead includes inkjet nozzles, but is silent wherein said inkjet nozzles include drop-on-demand piezoelectric inkjet nozzles or continuous piezoelectric inkjet nozzles.

Rezanka discloses an ink jet printing apparatus comprising ink jet nozzles including either drop-on-demand piezoelectric inkjet nozzles or continuous piezoelectric inkjet nozzles (*column 12, lines 10-13*) for ejecting ink droplets to form images on a printing medium.

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to structure the inkjet printhead in Iwatsuki et al.'s printing apparatus (as modified) to include either drop-on-demand piezoelectric inkjet nozzles or continuous piezoelectric inkjet nozzles for ejecting ink droplets to form images on a printing medium as disclosed by Rezanka.

The motivation for doing so would have been well known in the art that because drop-on-demand or continuous piezoelectric ink jet nozzles do not produce heat during ink ejection like

thermal inkjet nozzles so the ink ejection is more stable due to less variation in term of the temperature than that in case of thermal inkjet nozzles.

3. Claims 1-3, 22, 27-28, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwatsuki et al. (US 2003/0197772 A1) in view of Morita et al. (US 6879378).

Iwatsuki et al. discloses a printing machine comprising:

a rigid frame (*FIG. 1, element 1*);

a first linear motion X axis stage (*FIG. 1, elements 11, 11a-b*) mounted on said frame;

a first printing table assembly (*FIG. 1, elements 12, 13, 15*) configured for moving back and forth on said linear X axis stage (*FIG. 1: The stage 11 linearly moves from FRONT SIDE to REAR SIDE and versa*);

a linear motion Y axis stage (*FIG. 1, elements 2-4*) mounted on said frame perpendicular to said linear X axis stage, above said printing table assembly (*FIG. 1: The carriage 4 moves along a direction perpendicular to the moving direction of printing table assembly 11*);

an array of inkjet nozzles (*FIG. 1, element 5 and paragraph [0066]: The printing head 5 has a plurality of nozzles*) mounted on said linear Y axis stage for linear motion perpendicular to said X axis stage (*FIG. 1: The carriage 4 moves the printhead 4 across the printing table assembly*);

wherein while said printing table assembly passes by said array of inkjet nozzles during said back and forth movements said array of inkjet nozzles is substantially static on said linear

Y axis (*FIG. 1: During a movement of the table assembly to a desired position to start printing or to a position to unload the work fabric after printed, the ink jet printhead 4 is static*).

Iwatsuki et al., however, does not teach a second linear motion X axis stage mounted on said frame parallel to said first axis stage, and arranged for operation independently of said first axis stage or a second printing table assembly movable on said linear X axis stage base independently of said first printing table assembly.

Morita et al. discloses an image forming apparatus for forming a pattern on each of at least two workpieces positioned on associated linearly movable support tables/stages, wherein the linearly movable support tables/stages (*FIG. 6, elements 10, 20*) are mounted on the same frame (*FIG. 6, element 5*), being parallel, and arranged for independently operation (*FIG. 6: The two tables 10, 20 move along the parallel directions L1 and L2 and each having independent function at a time*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify Iwatsuki et al.'s printing apparatus to include a second table/stage that is parallel and independently operates from the first table/stage as disclosed by Morita et al.

The motivation for doing so would have been to be able to alternatively transfer the tables between a load/unload position and an image/pattern forming position and alternatively form images/patterns on the tables so at least two workpieces can be processed simultaneously in order to increase the throughput of the apparatus as taught by Morita et al. (*column 3, lines 45-59*).

- **Iwatsuki et al. also teaches the following claimed invention:**

  Regarding to claims 2, 27: wherein said printing table assembly comprises a media-

holding plate (*FIG. 5A-D, element 15*) and an openable cover (*FIG. 1, element 14*) pivotally coupled to said media-holding plate for holding said media firmly against said plate (*FIG. 5A-D*).

Regarding to claims 3, 28: wherein said media-holding plate (*FIG. 5A-D, element 15*) includes a raised portion (*FIG. 5A-D, element 12*), and said cover includes a window (*FIG. 5A-D: The window is defined by the inner frame 19 of the frame structure (cover) 14*) of the same shape and slightly larger than said raised portion (*FIG. 5A-D, elements 12 and 19: The width of the inner frame (window) 19 is slightly wider than that of the raise portion 12*).

Regarding to claim 32: wherein said back and forth movement comprises a circular movement (*paragraph [0008]: The movement of a garment/fabric can be conveyed by belts that are moved circularly).*

4. Claims 7-8, 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwatsuki et al. (US 2003/0197772 A1) in view of Morita et al. (US 6879378), as applied to claims 1 and 22, and further in view of Rezanka (US 5757407).

Iwatsuki et al., as modified, discloses the claimed invention as discussed above and also teaches wherein the printhead includes inkjet nozzles, but is silent wherein said inkjet nozzles include drop-on-demand piezoelectric inkjet nozzles or continuous piezoelectric inkjet nozzles.

Rezanka discloses an ink jet printing apparatus comprising ink jet nozzles including either drop-on-demand piezoelectric inkjet nozzles or continuous piezoelectric inkjet nozzles (*column 12, lines 10-13*) for ejecting ink droplets to form images on a printing medium.

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to structure the inkjet printhead in Iwatsuki et al.'s printing apparatus (as modified) to include either drop-on-demand piezoelectric inkjet nozzles or continuous

piezoelectric inkjet nozzles for ejecting ink droplets to form images on a printing medium as disclosed by Rezanka.

The motivation for doing so would have been well known in the art that because drop-on-demand or continuous piezoelectric ink jet nozzles do not produce heat during ink ejection like thermal inkjet nozzles so the ink ejection is more stable due to less variation in term of the temperature than that in case of thermal inkjet nozzles.

5. Claims 6, 9-11, 24-26, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwatsuki et al. (US 2003/0197772 A1) in view of Morita et al. (US 6879378), as applied to claims 1 and 22, and further in view of Codos (US 6755518).

Iwatsuki et al., as modified, discloses the claimed invention as discussed above except a curing unit located above each said printing table assembly and arranged to cure ink on media on said printing assembly (**Regarding to claims 9, 24**), wherein said curing unit is an infrared system or a hot air blowing unit (**Regarding to claims 10-11, 25-26**), and wherein at least part of said printing table assembly is a vacuum table (**Regarding to claims 6, 29**).

Codos discloses an ink jet printing apparatus including an ink jet printhead (*FIG. 1, element 125)* for forming images on a printing medium (*FIG. 1, elements 15)* conveyed by a vacuum conveyor (*FIG, 1, element 105, 121*) and a curing unit located above the printing medium to cure ink deposited on the printing medium, wherein said curing unit is an infrared system or a hot air blowing unit (*FIG. 1, elements 124, 126; column 8, lines 62-64: Heating by forced hot air is preferred, although other heat sources, such as infrared heaters can be used*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time

invention was made to modify Iwatsuki et al.'s printing apparatus (as modified) to include a curing unit to cure ink deposited on the printing medium as disclosed by Codos.

The motivation for doing so would have been to cure the ink upon its contacting the substrate (printing medium) to prevent ink spreading and wicking that affect printing quality as taught by Codos (*column 2, lines 65-67*).

6. Claims 12 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwatsuki et al. (US 2003/0197772 A1) in view of Morita et al. (US 6879378), as applied to claims 1 and 22, and further in view of Rasmussen et al. (US 6536894).

Iwatsuki et al., as modified, discloses the claimed invention as discussed above except an ironing unit located above each said printing table assembly and arranged to iron media on said printing table assemblies.

Rasmussen et al. discloses an ink jet printing apparatus including an ink jet printhead (*FIG. 2B, element 14*) for forming images on a printing medium conveyed by a conveyor (*32*) and an ironing unit located above said printing medium and arranged to iron said printing media before printing thereon (*FIG. 2B, elements 201', 202; column 3, lines 32-38: Heating and pressing the print media upstream of printing to flatten print media prior to ink jet printing thereon*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify Iwatsuki et al.'s printing apparatus (as modified) to include an ironing unit located above the printing medium to iron the printing media before printing as disclosed by Rasmussen et al.

The motivation for doing so would have been to provide a flat and stable media for printing in order to improve image quality as taught by Rasmussen et al. (*column 4, lines 19-24*).

7. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwatsuki et al. (US 2003/0197772 A1) in view of Morita et al. (US 6879378), as applied to claim 1, and further in view of Nakamura et al. (US 2003/0142167 A1).

Iwatsuki et al., as modified, discloses the claimed invention as discussed above except wherein said linear motion X axis stage is a linear motor driven stage and said linear motion Y axis stage is a linear motor driven stage.

Nakamura et al. discloses an ink jet printing apparatus comprising a linear motion X axis stage (*FIG. 9, elements 19, 52-53*) to convey an ink jet printhead *(FIG. 9, element 22*) to form images on a printing medium (*FIG. 9, element 12*) positioned on a printinb table (*FIG. 9, element 49*) conveyed by a linear motion Y axis stage (*FIG. 9, elements 21, 54, 56*), wherein both X and Y linear motion stages are linear motor driven stages (*paragraphs [0103]-[0104]: An X slider/stage 53 contains a linear motor. A Y slider/stage 56 contains a linear motor. The X and Y sliders move when the associated built-in linear motor is opera*ted).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify Iwatsuki et al.'s printing apparatus (as modified) to move/drive the stages by linear motors as disclosed by Nakamura et al.

The motivation for doing so would have been because it is possible to control a position of the ink jet head supported by the X stage and a position of the printing table supported by the Y stage very precisely as taught by Nakamura (*paragraph [0105]*).

Response to Arguments

Applicant's arguments filed 11/29/2006 have been fully considered but they are not persuasive.

First of all, the applicants argued that Iwatsuki's printhead was not designed to be static while ink is delivered on the moving printed substrate during the printing process. It is the examiner's point of view that the applicant's argument is over commensurate the scope of the claim invention because the claim language does not define wherein the ink jet printhead delivers ink on the passing printing table assembly. In fact, the claim language simply defines while the printing table moves back and forth, the printhead is substantially static. As discussed above, Iwatsuki's FIG. 1 shows that during the forthward movement of the table assembly to locate an unprinted fabric to a desired position for the printhead to start printing or during the backward movement of the printing table to a position to unload the fabric after printed, the ink jet printhead is static.

In response to the applicant's assertion that there was no suggestion or motivation to combine Iwatsuki and Morita. As discussed above, the modification of Iwatsuki in view of Morita to add more printing tables into Iwatsuki's printing apparatus so the apparatus can alternatively transfer the tables between a load/unload position and a printing position so at least more than one workpieces can be processed simultaneously to increase the throughput of the apparatus.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S. NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D. MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LAM SON NGUYEN